

Project title: Assessment of Land Cover Changes in the Upper Snake River Plain and Greater Yellowstone Ecosystem

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Additional investigator(s): Chris Witt

Objective: Gather vegetation ground truthing information to assess the accuracy of remote sensing image processing techniques and estimate the ecological effects of land cover change.

Findings: Accuracy and effects pending statistical analysis. Tentative results indicate the ability to confidently identify cover changes of greater than 30 percent loss or gain of cover. There is some indication of ability to identify as little as 5 percent loss or gain in cover.

Project title: Development of Algorithms to Use with Satellite Images to Assess Annual Snow Melt and Green-Up In Yellowstone National Park

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Objective: This thesis is a methodology for use in conjunction with satellite imagery to determine snow cover and green up in Yellowstone National Park that can be used on a near-real-time basis. The methodology includes an Avenue Script in ArcView to perform the algorithms that accurately identify changes in snow cover and green up. They will be accompanied by a descriptive text including instructions for use and assumptions. The overall objectives of the study are to use satellite imagery and develop a method to determine percent of ground covered by snow and changes in forage quantity (green up).

Findings: The study and thesis are complete. An algorithm compatible with the Yellowstone Spatial Analysis Center, using ENVI, is being developed. Estimates of ground covered by snow (snow cover) from

two aerial reconnaissance flights were regressed against raw and calibrated pixel numbers for the five band images from the corresponding days. The linear regression model using band 4 of georeferenced and calibrated AVHRR images estimated snow cover (Adjusted R² = 0.856, alpha = 0.001). To estimate green biomass, linear models derived by Thoma (1998) were used and ground reference data were collected during the growing season in Yellowstone National Park to evaluate the application of the model for this study area. Results of the linear model were satisfactory (Adjusted R² = 0.592, alpha = 0.0001). The algorithm is contained in a file created to aid in the use of the models for estimation of snow cover and green biomass.